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ABSTRACT

This chapter presents a study which used data from the U.S. National Longitudinal Survey of Youth (NLSY) to examine racial differences in the effects of college quality and student diversity on wages. The study investigated whether the economic benefit of college quality might be higher for groups helped by diversity programs and whether a racially diverse student body would directly benefit all students. The NLSY provided data on student characteristics and demographics, student ability, college attended, and post-college wages. For each respondent who attended college, researchers collected data on college characteristics from the U.S. Department of Education's Integrated Postsecondary Education Data System and U.S. News and World Report's Directory of Colleges and Universities. There was a much larger effect of college quality on the later wages of blacks than non-blacks. Attending a college with moderate student diversity, as measured by the fraction of black students, raised earnings for both black and non-black men. For women, there was a weaker effect that applied only to black women. In regard to the effects of college quality on black and non-black students, there was an effect on black male students from three to four times as large as that for non-black male students. (SM)

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CHAPTER 10

Racial Differences in the Effects of College Quality and Student Body Diversity on Wages

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In recent years, the advent of affirmative action programs at colleges and universities in the United States has generated widespread controversy. Bowen and Bok (1998) and Trow (1999) provide recent examples on either side of the issue. One of the most notable aspects of this controversy is that, until very recently, empirical evidence has played a very small role in it. In this chapter, we contribute to the discussion by providing empirical evidence on two related questions that underlie the debate. Our study finds that there may be substantial earning gains related to diversity, gains that may extend to white as well as black students.

Diversity programs have the effect of raising the average quality of the university that students in the minority group favored by the program attend, relative to what their other characteristics would imply.[1] Such programs have a wide variety of potential justifications, but we focus only on two possible economic rationales for these programs. The first is that the return to college quality may be higher for the group helped by the program. If so, to the extent that the taxpayers rather than the students provide the funds for higher education, it makes sense for colleges, acting as the taxpayers' agents, to spend those funds where their return is highest.

The second is that a racially diverse student body may have direct benefits to students in either the minority or the majority group. A di-

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verse student body may provide minority students with access to wider social networks, which in turn could lead to better jobs and higher earnings. At the same time, being able to interact with individuals from other racial (and, in many cases, family income) backgrounds may be a skill that the market values; majority students who attend universities with racially diverse student bodies may be more likely to learn this skill. In either case, affirmative action programs might then be justified on the grounds that they increase the value of the education provided by the university.

In this chapter we use data from the National Longitudinal Survey of Youth (NLSY)—a random sample of young people in the United States—to provide basic evidence on both of these questions. First, using information on college quality collected from two sources, matched to information on the colleges attended by members of our sample, we estimate the effect of college quality on wages separately for blacks and nonblacks.[2] Second, using information on the fraction of black students at each college, we estimate the effect on later wages of attending a college with a more diverse student body.[3]

The NLSY is ideal for this purpose, for two reasons. First, selection bias is a major risk when estimating the effect of college quality on wages. We expect students at high-quality universities to differ in important ways from students at low-quality universities because the selection of colleges by students (and vice versa) is not random. For example, students at higher-quality colleges may be there largely because they have higher ability, more motivation, better-educated parents, or have attended better primary and secondary schools. These characteristics also increase later wages, so failure to control for them in estimating the effect of college quality leads one to overstate its effect. Unfortunately, these characteristics, while obvious to college admissions officers, are often hidden from researchers trying to understand wages.

The NLSY contains a rich set of observable characteristics that, taken together, reveal some of the differences across students that remain hidden in other data sets. The data include an ability measure, geographic location, characteristics of the parents and of the student's home environment as a child, high school characteristics, and detailed labor market histories before, during, and after college. Because many colleges use test scores and high school grades as major determinants of admissions, it is particularly important that data contain a well-regarded measure of academic ability. This measure is based on the Armed Services Vocational Aptitude Battery (ASVAB). Numerous authors, including O'Neill (1990), Blackburn and Neu-

mark (1992), and Neal and Johnson (1996), have used these ASVAB scores to control for otherwise unobserved differences in ability. By controlling for all of these characteristics, we can reduce (or eliminate) the selection bias in our estimates of the effect of college quality.

The second reason for making use of the NLSY in this context is that it represents the most recent panel with several years of available post-college wage data. Thus, we can look at the effect of college quality or of student body racial composition in college on wages after most of the respondents have had a few years to get established in their careers.

The NLSY data provide a strong answer to one of the questions we address and mixed findings on the other. The mixed findings concern the question of whether or not the racial diversity of the college student body (here proxied by the percentage of students who are black) has an effect on later wages. We find a positive effect for men who are not black of attending a college with at least 5 percent black students. The data suggest a hill-shaped pattern with the largest positive wage effect on nonblacks attending colleges with 8 to 17 percent black students. We cannot reject the hypothesis that the effects of the percentage of black students on later wages do not differ between black and nonblack men. In contrast, Daniel, Black, and Smith (1995) find no evidence of an effect on white women and only modest evidence of an effect for black women. For the latter group, the largest effect is associated with colleges with from 5 to 7 percent black students, rather than from 8 to 17 percent as for black men.

Our data provide stronger evidence regarding the other question we address, whether and how much college quality affects later wages. We find that the effect of college quality on the later wages of black men is roughly triple that for nonblack men. We report a similar finding for women in Daniel, Black, and Smith (1995). For both men and women, this result is not sensitive to alternative ways of specifying the wage equation. It is consistent with Loury and Garman's (1995) finding of larger effects of college quality for black men in their study using the National Longitudinal Survey of the High School Class of 1972. The benefit to attending a higher-quality college or university is apparently much greater for black students than for others.

In the next section we describe our data. In section three, we describe the construction of our index of college quality. Section four presents our empirical findings. Finally, in section five we draw some conclusions from our findings and offer some important caveats regarding their interpretation.

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Data

Our data come from three sources. Our primary source is the NLSY, a panel data set based on annual surveys of a sample of men and women who were ages 14–21 on January 1, 1979. Respondents were first interviewed in 1979 and have been reinterviewed each year since then. Of the five subsamples that comprise the NLSY, we use only the representative cross-section and the minority oversamples.

The NLSY provides the identity of the colleges that respondents attended. For each respondent who attended college, we attach his or her college's characteristics. Our data on college characteristics come from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) for 1990 and *U.S. News and World Report*'s Directory of Colleges and Universities (1991). The former source provides most of the information about the colleges' finances and faculties; the latter provides most of the summary information about the colleges' students. Because data are available on college characteristics only for a limited number of two-year colleges, we only include information on four-year colleges in our data.[4]

The College Quality Index

Our data include seventeen different college characteristics. Empirically, we find in Daniel, Black, and Smith (1995, 1997) that for both men and women, these characteristics positively correlate with one another.[5] Related to this, each one entered separately has a positive effect on later wages (when coded so that higher values correspond to higher "quality"). To simplify the interpretation and exposition of our analysis, and because we view each of these characteristics as a noisy measure of some underlying true notion of quality, we construct a quality index based on a subset of these variables.[6]

In this chapter, we use the indices we constructed in Daniel, Black, and Smith (1995, 1997). Because not all of the college characteristics are available for every college, we faced a trade-off in constructing the indices between the number of variables used in the index and the number of colleges for which the index could be calculated. We found empirically that indices based on at least three characteristics tended to be highly correlated with one another, while indices constructed with only two characteristics sometimes were not. We carefully examined the correlations across indices constructed using different characteristics and the number of colleges for which we could construct each index. Based on this exami-

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nation, we use the first factor of spending per student, the rejection rate, and the average SAT score of the entering class as our index for men. For women, we use the first principal component[7] of spending per student, the faculty/student ratio, the rejection rate, the average SAT of the entering class, and the fractions of the entering class in the top 10 and top 25 percent of their high school class.

While our choice of characteristics to use in constructing the indices is somewhat ad hoc, they appear to do a good job of capturing what we mean by college quality. The rankings of the colleges implicit in our indices correspond well to a priori notions of quality. For example, for men the top five colleges are Stanford, MIT, Yale, Harvard, and Columbia. Visual inspection of the entire rankings for both men and women suggest that the indices produce a reasonable ordering of colleges. Finally, the results presented in the next section are robust to variation in the particular characteristics included in the indices.

Empirical Findings

In this section we present our findings regarding the effect of university quality and racial composition of the college student body on later wages for both blacks and nonblacks. Table 1 presents our estimates for men in the NLSY. For reasons of space, we discuss but do not present results for women.[8] For each specification in Table 1 we report selected coefficients of interest from a regression, with the natural log of the real wage for the year ending in the 1987 interview as its dependent variable. Each column in the table corresponds to a different set of conditioning variables; a complete list of the variables in each specification appears in the notes to the table. With the exception of the final column, the set of conditioning variables becomes richer, moving from left to right in the table. Surprisingly, our substantive results do not depend on the set of conditioning variables used.

The first pair of rows in Table 1 shows the estimates from regressions that include the fraction black of the student body at each respondent's college, along with an interaction term between the fraction black and whether or not the respondent himself is black. The estimated effect for nonblacks consists of the coefficient on the fraction black variable, while the estimated effect for blacks consists of the sum of the coefficient on the fraction black and that on the interaction term. For example, in the first column the estimated effect for nonblacks is 0.431, while that for blacks is –0.102 (= 0.431–0.533). These estimates indicate a small and marginally

statistically significant impact of the fraction black on the wages of nonblack men, and no effect, or a small negative effect, on the wages of black men.

The next three rows present the estimated coefficients from adding our college quality index to the specification just considered. To the extent that college quality is correlated with the fraction of black students, omitting it may bias the coefficient on the fraction of black students. We find that including the quality index reduces the standard errors on the fraction black variable, so that the positive effect for nonblacks is now consistently statistically significant. The point estimates of the fraction black coefficient also increase somewhat in all of the specifications. Overall, however, the key substantive findings remain unchanged.

The final set of four rows presents the coefficient estimates from a specification that adds an interaction between the college quality index and whether or not the respondent is black. This interaction term allows us to obtain separate estimates of the effect of the quality of college on the later wages of blacks and nonblacks. We consider the estimated quality effects shortly; first, note that adding this additional interaction term has almost no effect on the estimated coefficients for the fraction black variable or its interaction with whether the respondent is black.

The specifications presented in Table 1 allow only a linear effect of the fraction of black students at the respondent's college on his wage. To check for potential non-linear effects, Daniel, Black, and Smith (1997) divide the fraction black into categories and include categorical indicators in the log wage equation in place of the fraction black variable (see their Table 4). Because of the very different distributions of the fraction black variable among black and nonblack NLSY respondents, choosing categories such that each category includes a reasonable number of blacks and nonblacks is somewhat difficult. In the NLSY, for nonblack men, the 25th percentile is 2 percent black; the 50th percentile is 5 percent; the 75th percentile is 8 percent. For black men, the 25th, 50th, and 75th percentiles are 7, 16, and 83 percent black, respectively.

After careful examination of the available data, Daniel, Black, and Smith (1997) use categories of 0–4 percent black, 5–7 percent black, 8–17 percent black, and more than 17 percent black. They include indicators for the latter three categories both by themselves and interacted with an indicator for whether or not the respondent is black. For specifications without the interaction terms, those attending colleges with between 5 and 7 percent black students earn more than those attending colleges with fewer than 5 percent black students. In addition, men attending colleges with between 8 and 17 percent black students earn more than men

TABLE 1 *Wages and Racial Composition of Student Body*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Race							
Fraction black	.431**	.402*	.305	.304	.357*	.346	.443**
	(.213)	(.210)	(.216)	(.216)	(.215)	(.214)	(.206)
Fraction black interacted with black indicator	−.533**	−.506**	−.427*	−.431*	−.491**	−.475**	−.556**
	(.228)	(.226)	(.231)	(.231)	(.230)	(.230)	(.222)
Fraction black	.498**	.468**	.379*	.376*	.429**	.422**	.514**
	(.218)	(.214)	(.217)	(.218)	(.216)	(.214)	(.209)
Fraction black interacted with black indicator	−.542**	−.517**	−.440*	−.444*	−.502**	−.487**	.566**
	(.229)	(.227)	(.231)	(.230)	(.229)	(.228)	(.222)
College quality index	.068**	.071**	.070**	.069**	.066**	.066**	.069**
	(.022)	(.021)	(.021)	(.021)	(.020)	(.020)	(.021)
Fraction black	.497**	.468**	.380*	.376*	.431**	.424**	.517**
	(.218)	(.214)	(.217)	(.217)	(.215)	(.214)	(.209)
Fraction black interacted with black indicator	−.483**	−.454*	−.386*	−.389*	−.444*	−.431*	−.501**
	(.233)	(.231)	(.234)	(.234)	(.232)	(.231)	(.226)
College quality index	.050**	.052**	.053**	.053**	.048**	.048**	.048**
	(.024)	(.024)	(.023)	(.023)	(.022)	(.023)	(.024)
College quality index interacted with black indicator	.099**	.109**	.095*	.095*	.103*	.101*	.117**
	(.057)	(.055)	(.056)	(.056)	(.057)	(.056)	(.055)

[1] "**" indicates statistical significance at the 5 percent level; "*" indicates statistical significance at the 10 percent level.

[2] The sample size is 2,834 in each column.

[3] White (1980) heteroskedasticity-consistent standard errors appear in parentheses.

[4] The dependent variable is the natural log of the wage for the year ending in the 1987 interview. All specifications include a constant, a variable indicating whether or not the respondent had any postsecondary schooling, ability controls in the form of the first two principal components of the respondent's age-adjusted ASVAB scores and these two variables squared, years of schooling completed, years of postsecondary schooling completed, quartics in age, tenure, pre–college-graduation labor market experience and postcollege-graduation labor market experience, and indicators for race and ethnicity, Census region, urban residence and receipt of a bachelor's degree. Specification (2) adds indicators for college major. Specification (3) adds indicators for industry of employment in 1987 and union status to specification (2). Specification (4) adds variables capturing characteristics of the respondent's home environment while growing up to specification (3). Specification (5) adds characteristics of the respondent's parents to specification (4). Specification (6) adds characteristics of the respondent's high school to specification (5). Specification (7) repeats specification (6) but drops the industry of employment and union status variables. Daniel, Black, and Smith (1995, 1997) describe the construction of the variables in detail.

[5] In all cases, with the exception of the dependent variable, we include indicators for values missing due to item nonresponse rather than performing list-wise deletion.

attending schools with fewer than 8 percent black students and more than 17 percent black students.

Daniel, Black, and Smith (1997) report similar findings when they include interactions between the fraction black categories and the indicator for whether or not the respondent is black. In particular, formal statistical tests do not reject the null hypothesis that the coefficients on the interaction terms for the fraction black categories are zero. This evidence suggests that the relationship for men between the fraction of black students at their college and later wages is hill-shaped for both groups. The signs of the coefficients in Table 1 on the fraction black variable result from the differing distributions of the fraction black variable among blacks and nonblacks in the data. The nonblack data are concentrated in the upward sloping part of the hill at low levels of the fraction black, while the black data are concentrated on the downward-sloping part of the hill at higher levels of the fraction black. The result is a positive coefficient for nonblacks and a negative coefficient for blacks when estimating a linear specification like that in Table 1.

Our findings for women, reported in Daniel, Black and Smith (1995), reveal much less evidence of an effect of the fraction of black students in college on later wages. We find no effect for white women in any of the specifications we examine. In every specification we examine for this group, we estimate small positive coefficients with relatively large standard errors. For black women, we find evidence that attending a college with 5 to 7 percent black students is associated with higher wages later on, compared to colleges with a higher or lower percentage black. The magnitude of the effect is about twice what we found for men.

In sum, even after controlling for college quality and student characteristics, we find evidence that attending a college with a moderately diverse student body, as measured by the fraction of black students, raises earnings for both black and nonblack men. In contrast, for women we report evidence of a weaker effect that appears to apply only to black women.

We now turn to the effects of college quality on black and nonblack students. For this question, the results for men and women stand in complete agreement. The estimates in the final row of Table 1 imply an effect of college quality on black male students from three to four times as large as that for nonblack male students. These estimates represent a substantively important effect: for nonblack men they imply around a 10 percent increase in wages when going from the bottom quintile to the top quintile of the distribution of college quality in our sample. Similar estimates emerge in specifications without the fraction black variable or its interaction with whether the respondent is black. As noted earlier, Loury

and Garman (1995) report a similar finding using different data on men in an earlier cohort. Daniel, Black, and Smith (1995) find a similar ratio in their estimated effects of college quality for black and white women, although the results are somewhat less robust for women than for men.

Conclusion

In this chapter we provide empirical evidence from a recent cohort of American youth on two fundamentally empirical questions that underlie the policy debate surrounding diversity programs that favor minority groups in college admissions. In regard to the first question, the different effects of attending a higher-quality college on black and nonblack students, we find strong evidence of a much larger effect of college quality on the later wages of blacks than of nonblacks. This finding is consistent with that found by other authors using different data sets. The larger effect for blacks provides an efficiency justification for diversity programs at good colleges. Our analysis does not distinguish effects of college quality resulting from increased productivity from those resulting from the value of college quality as a signal in the labor market. That topic remains for future work.

We regard our findings on the effects of a racially diverse student body on later wages as provocative but at the same time merely suggestive. Policy should not be based upon them but, we argue, future research should be. The reasons for thinking the results provocative hardly need stating. If the relationship we find in the data really is causal, so that male students (and black female students) at more racially diverse colleges have higher wages later in life, then this has important implications for policy in this area.

At the same time, there are empirical and theoretical reasons for being cautious about basing policy on these results. First, we cannot ignore the possibility that the fraction black variable may proxy for some other dimension of college quality not well captured by our quality index. In this case, the observed relationship results from omitted variable bias, not from a causal effect of the fraction of black students in college on later wages. Second, our diversity measure is not ideal and corresponds to only one part of what most college diversity programs do. Such programs typically seek to increase the representation of many minority groups in addition to blacks. Our results, obviously, have nothing to say about the other aspects of these programs.

Third, the lack of a consistent effect across groups of the fraction black variable may be a red flag. We find no effect for white women and a

different relationship in terms of the optimal fraction black for black women than we find for black men. We can think of no theoretical reason why a causal effect would differ between men and women, so the differences are troubling. They suggest that we have uncovered something other than a causal relationship. Fourth, we hesitate to push the view that this relationship is causal in the absence of what economists call "microfoundations." That is, we would like to see a well-developed theory of how the fraction of students who are black can affect later wages, and to see some empirical evidence at the micro level consistent with that theory. In the absence of a convincing story at the micro level, a strong interpretation of our estimates awaits further research.

Finally, we note that in a complete cost-benefit analysis of college diversity programs, many other factors must weigh in beyond just later wage effects, should our results turn out to reflect a causal impact. These other factors include the dissension and acrimony observed on some campuses over unequal entrance requirements across groups. At the same time, our results regarding the racial composition of the college student body are surprising and highly provocative. Further research could shed additional light on the extent to which the estimated effects are causal, on the reasons for the different effects found for men and women, and on the individual-level behavior that accounts for the measured effects at the group level.

Notes

1. For the remainder of the chapter, we use the term *diversity program* or just *program* to refer to the full range of programs from affirmative action as originally conceived right up through explicit numerical quotas.
2. We are unable to examine the effect of college quality on later wages separately for members of other racial and ethnic groups due to sample size limitations. Our combining African Americans with other black ethnic groups was similarly driven by sample size considerations. The vast majority of the respondents we characterize as "black" identify themselves in the NLSY as "African American."
3. While we would prefer to examine multiple measures of racial and ethnic diversity, including in particular measures that included groups other than just blacks, the available data limit us to this single measure.
4. For a more detailed description of the data, see Daniel, Black, and Smith (1995, 1997).
5. All of the variables were coded so that higher values correspond to higher quality.
6. Daniel, Black, and Smith (1997) provide a theoretical justification for our procedure for constructing the indices based on the idea that the individual characteristics constitute noisy signals of a latent unobserved quality variable.
7. In both samples, quality indices constructed using factor analysis or principal components analysis on the same set of variables have a correlation of 0.99. Our theoretical justification corresponds more closely to factor analysis.

8. Daniel, Black, and Smith (1997) present a full set of results for men, while Daniel, Black, and Smith (1995) present a full set of results for women.

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